

**EMBRY-RIDDLE AERONAUTICAL UNIVERSITY**  
**Department of Computing and Mathematics**  
**COURSE OUTLINE FOR**

**Course No.:** MSE610  
**Cr Hrs:** 3

**Title:** Software Systems Architecture and Design

**Lecture Hours:** 3

**Laboratory Hours:** 0

**COURSE DESCRIPTION:**

This course is concerned with the principles and concepts relevant to the software engineering process of designing large programs and systems and the products generated as a result of enacting the process. Software design is studied as a two step process of building an abstract model of the software system and refining this model into an implementation form, along with the products of the design process such as high-level and detailed designs. The course provides an introduction to a range of design methodologies, together with a description of their uses and limitations as well as principles that are used to assess the quality of a design process and products. In-depth study of Object- and Function-Oriented design methods, and use of Computer Aided Software Engineering (CASE) tools and review techniques (Peer Review, Inspection, Structured Walkthroughs) in the design process. Also covered are advanced topics related to software architectures and design patterns. Students will participate in individual and group projects on high-level and detailed designs of a software system. The course also includes definition and development of a process guideline for design process. Prerequisite: MSE530

**GOALS:**

Provide students with knowledge and understanding of issues related to development of detailed design and implementation of large scale software systems. Students will be exposed to all elements of detailed design and implementation of software systems, this includes, design and implementation trade-offs, representations, methodologies, tools and programming environments that are employed. In addition, students learn about how to define, measure and improve processes related to detailed design and implementation of software systems.

**PERFORMANCE OBJECTIVES:**

1. Describe the essential elements of design of software systems.
2. Discuss the major problems in design in large scale software systems.
3. Describe and understand various software design techniques.
4. Develop, analyze and critique design of a software system.
5. Describe and understand different software architectures.
6. Describe and understand the notion of software patterns.

7. Define processes for performing detailed design and implementation of software systems.
8. Measure and improve processes related to detailed design and implementation of software systems.
9. Use modern software development tools and environments.

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COURSE OUTLINE FOR MSE610, Continued**

**TEXTBOOK:**

Budgen, David, *Software Design*, Addison-Wesley, 1994.

**SUGGESTED SUPPLEMENTAL MATERIALS:****PREREQUISITE KNOWLEDGE BY TOPIC:**

TOPIC	CLASS HOURS	COURSE OBJECTIVES
1. Introduction to Design of Software Systems	2	Describe the essential elements of design of software systems
2. Software Design Definition	2	Discuss the major problems in design in large scale software systems
3. Design in Software Development Process	1	Describe and understand various software design techniques
4. Elements of Software Design	3	Discuss the major problems in design in large scale software systems
5. Software Design Practices	12	Describe the essential elements of design of software systems. Describe and understand various software design techniques
6. Software Architectures	12	Describe and understand different software architectures
7. Software Design Patterns	6	Describe and understand the notion of software patterns
8. Software Design Metrics	3	Develop, analyze and critique design of a software system
9. Process Definition, Measurement and Improvement	2	Define processes for performing detailed design and implementation of software systems

**LABORATORY:**

None

**COMPUTER USAGE:**

Occasional use as a learning tool in the classroom.

**GRADING SYSTEM:**

Reports	10%
Term-Project(s)	50%
Mid-Term Exam	40%

**ESTIMATED CONTENT:**

<b>Skills:</b>	<b>50%</b>
<b>Content:</b>	<b>50%</b>